KNOWLEDGE OF CERVICAL CANCER, HUMAN PAPILLOMA VIRUS (HPV) AND HPV VACCINATION AMONG PRIMARY HEALTH CARE WORKERS IN THE MAMUSA AND NALEDI SUB-DISTRICTS, NORTH WEST PROVINCE, SOUTH AFRICA

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Research Report submitted to the Faculty of Health Sciences,

University of Witwatersrand, Johannesburg,

in partial fulfillment of the requirements for the degree of

Master of Medicine in Family Medicine

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Johannesburg, September 2017

DECLARATION

I, Adekunle Omoniyi Ajayi, Student no 778230, declare that this research report is my own work. It is being submitted for the degree of Master of Medicine in Family Medicine to the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree at this or any other University.

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……day of ……..2017

DEDICATION

This work is dedicated to my wife, Adetoun Ajayi, for her unflinching support.

ACKOWLEDGEMENTS

Many thanks to

1. My supervisor, Dr Sunny Abizu for his assistance throughout all the phases of the planning and conduct of this study.
2. The management of Dr Ruth Segomotsi Mompati district municipality for permission to conduct the study in the district.
3. Dr Elizabeth Reji for her support throughout all the phases of the study.
4. The primary health care workers in the Mamusa and Naledi sub-districts who willingly participated in the study.

ABSTRACT

Introduction: Cervical cancer is a very common female cancer; with up to 524,000 cases being diagnosed annually worldwide.[1] Human papilloma virus (HPV) has long been established as the causative factor in the development of cervical cancer.[2, 3] HPV vaccination has been found to drastically reduce the development of cervical cancer especially if administered to young people before their sexual debut. This study was to assess the knowledge of primary health care workers in the Mamusa and Naledi sub-districts in the North West Province about cervical cancer, HPV and the HPV vaccine.

Methods: This was a descriptive cross-sectional study done with 116 primary health care workers using a self-administered questionnaire that was derived from a duet of questionnaires previously used in Poland and Australia. Adequate knowledge of cervical cancer and HPV vaccination meant getting 70% of the questions asked on the subject correctly while a threshold of 80% was used for adequate knowledge of HPV vaccination. All categories of primary health workers were included in the study asides from pharmacists who were excluded. Descriptive statistics, tests of association and logistic regression analysis was used in the study. The survey was done between September to November 2016 following ethics approval from the University of Witwatersrand.

Results: 116 participants were involved in this study. The majority were black female professional nurses with diplomas. The mean age of the participants was 36.6 ± 8.7 years. Only 26% of the respondents had adequate knowledge of cervical cancer. 41% of respondents had adequate knowledge of HPV, while 67% of respondents had adequate knowledge about HPV vaccination. In our study, we found a significant association between knowledge of HPV and the health care worker category ($p < 0.001$). There was a significant association between knowledge of HPV vaccination and the highest educational level that was attained by the respondents ($p= 0.010$).

Conclusion: Primary health care workers form an integral part in the fight against cervical cancer. Significant gaps still exist in the level of knowledge of health care workers, particularly in relation to cervical cancer and HPV. Improved learning and training opportunities for primary health care workers can help correct the knowledge deficit

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DEFINITION OF TERMS /ABBREVIATIONS

Primary health care workers – includes health worker categories such as doctors, clinical associates, professional nurses, enrolled nurses and enrolled nursing assistant in the various facilities.

Adequate knowledge of cervical cancer- ability to get 70% of questions asked regarding cervical cancer correctly.

Adequate knowledge of Human papilloma virus – ability to get 80% of the questions in the HPV section correctly.

Adequate knowledge of HPV vaccination- ability to get 70% of the questions posed correctly in the HPV vaccination section.

HIV – Human Immunodeficiency Virus

HPV – Human Papilloma Virus

CCKP 64 – Cervical cancer knowledge prevention questionnaire

CHAPTER ONE INTRODUCTION

1.1 Background to the research

Cervical cancer accounts for a significant amount of morbidity and mortality among women worldwide, with its attendant sequelae. Global estimates indicate that up to 528,000 new cases of cervical cancer are diagnosed annually.[1] It comes only after breast, colorectal and lung cancers respectively in terms of how commonly it occurs.[1] In South Africa, an estimation of its incidence indicates that up to 7,735 new diagnoses of cervical cancer are made per annum. It ranks as the second leading aetiology of female cancer. In women aged between 15 to 44 years, it has been noted to be the most common cancer in South Africa.[2]

Annually, 34.8 new cases of cervical cancer are diagnosed per 100 000 women in Sub-Saharan Africa, and 22.5 per 100 000 women die from the disease.[2] In North America, the estimated figures are 6.6 and 2.5 per 100 000 women respectively.[2] This huge discrepancy in incidence and mortality rates can be attributed to improved efforts in early preventive strategies, improved access to cervical screening, and treatment in developed countries as compared to developing countries. Other reasons that have been adduced for this difference include superior screening and management techniques.[2, 3]

The extremely high incidence and mortality figures observed particularly in developing countries points to the fact that a lot more still needs to be done to combat the scourge of cervical cancer, therefore the fight against cervical cancer must be escalated drastically if the associated mortality figures described are to be dealt with appropriately.

Human papilloma virus (HPV) has been isolated as the causative agent in the development of pre-invasive and invasive lesions of the cervix, vagina and the anogenital region.[4,5,6] While different serotypes of the HPV have been isolated, HPV 16 and HPV 18 are implicated in the development of malignant disease. Other serotypes that have been implicated in the development of cervical cancer include HPV 16, 18, 33, 31 and 45.[4,5] Irrefutable evidence of HPV being the causative agent in cervical cancer was made in 1976 by Harald Zur Hausen. This was when HPV DNA was discovered in cervical cancer and warts.[5]

The South African Department of Health, in response to the scourge of cervical cancer, instituted the national cervical screening programme to assist in early detection of the disease. The screening programme lays out the appropriate algorithm to follow based on the results of the screening tests.[6]

According to the national guidelines for cervical cancer screening instituted by the National Department of Health in 2005, the Papanicolaou (PAP) smear is the test of choice and it is advocated that females should ideally be tested from age 30, 40 and 50. These ten-year intervals are chosen based on the fact that the disease has a long premalignant stage, the sensitivity of the Pap test, and also due to cost implications.[6]

It was envisaged that from the inception of the programme that at least up to 70% of eligible women in the population would be reached within 10 years of commencement of the screening programme. The objectives of the programme were stated to be the reduction of the incidence of carcinoma of the cervix by detection and treatment of the preinvasive stages of the disease, reduction of mortality and morbidity associated with the disease, and the reduction of expenditure associated with the treatment of invasive stages of the disease.[6]

However, it has been noted that due to a myriad of factors, this programme has not been as successful as was envisaged at its inception. An underfunded and poorly developed health care system might be responsible for this.[7] It must also be noted that while the national programme for cervical cancer control still promotes the use of the Pap smear as the primary screening test, various advances such as the use of HPV testing based on new and relatively cheap technologies have not yet been integrated into the national cervical cancer screening guidelines in South Africa.

In the United States, the recent guidelines for cervical cancer screening recommend no screening for women aged below 21. It advocates that women aged 21-29 should be screened with cytology alone every three years. It also advocates HPV and cytology co-testing every five years, or cytology alone every three years.[8]

Recent advances in the fight against cervical cancer in South Africa include the introduction of a school-based HPV vaccination to girls of 9 years and above who are in school grade 4.[9] It is anticipated that eligible girls would be of an age in which they are yet to experience their sexual debut. This programme, instituted by the South African Department of Health in conjunction with the Department of Education, envisages the administration of two doses of the HPV vaccine to

school girls over a six-month period. It is envisaged that it will take up to two decades for the full effects of vaccination to result in cervical cancer reduction.

Health care workers are at the forefront of the fight against cervical cancer. It is therefore essential that they are knowledgeable about the risk factors of cervical cancer, HPV vaccination, and the human papilloma virus, which has been identified as the principal causal agent of cervical cancer. This is essential if the fight against cervical cancer and a drastic reduction in the unacceptably high mortality rate, especially in developing countries, is to be achieved.

1.2 Rationale for the study

The management of cervical cancer still presents a huge burden to individuals affected by it and their families. A significant proportion of the population depends on the public health system for their care with its attendant costs implications. Primary health care workers are an important bulwark against the unacceptably high rates of morbidity and mortality of cervical cancer due to the important role they play in the education of patients, screening, and the treatment of patients in various stages of cervical cancer.

The community has high expectations of primary health workers in this regard; however we do not know exactly if our primary health care workers are sufficiently knowledgeable about cervical cancer, HPV and HPV vaccination.

It must be noted that while a variety of studies have been done worldwide regarding the knowledge and awareness of health care workers on cervical cancer, HPV and HPV vaccination, [10, 11] there is a paucity of literature pertaining to this subject, especially among rural based South-African primary health care workers. This piqued the interest of the researcher to investigate if these primary health care workers, who are at the forefront of the fight against cervical cancer, are educated about it, and the human papilloma virus and HPV vaccination.

This study endeavours to ascertain if the different categories of primary health care workers such as doctors, professional nurses, enrolled nurses and clinical associates involved in the care of women in the Mamusa and Naledi sub-districts, are knowledgeable about cervical cancer, the

human papilloma virus and HPV vaccination. This would enable us to identify the existing gaps in health care worker knowledge, and to take necessary steps to remedy the knowledge deficit.

CHAPTER TWO LITERATURE REVIEW

2.1 Introduction on cervical cancer and HPV

Cervical cancer originates in the cervix, which connects the vagina to the uterus.[12] Several authors have affirmed that the human papilloma virus (HPV), a sexually transmitted virus, is the principal causative agent of the pre-malignant phase of cervical cancer and for the future development of full-blown cervical cancer itself.[4, 12-15] It has been described as a virulent carcinogenic agent that is also involved in the development of pre-invasive and invasive cancer of the vagina and the anogenital region .[4, 12, 14, 15]

The natural history of HPV has been described by several authors. Almost all HPV infections are asymptomatic and are noted to be sexually transmitted. HPV infections usually clear up naturally without intervention and in a timely fashion. In patients with intact immunity, the immune system negates the subsequent progress of the HPV infection.[12, 15] However, in some cases HPV persists, resulting in the development of pre-invasive and subsequently invasive forms of cervical cancer. HPVs that have been outlined as important in the development of cervical cancer include HPV16 and 18. Others that have been associated with the development of malignant disease are HPV 31, 33 and 45 respectively.[4, 12, 15]

In the development of cervical cancer, there is a progression from persistent HPV infection to the discovery of low-grade cervical lesions, which spontaneously resolve in a large proportion of patients.[4, 11, 12] As opposed to this spontaneous resolution, a minority of women with low-grade cervical lesions subsequently progress to high-grade cervical lesions or to pre-cancerous lesions involving the glandular cells of the endocervix.[12, 15]

High-grade cervical lesions are characterized by the presence of pre-cancerous cells on the surface of the cervix that are different from normal cells. Lack of proper management results in malignant proliferation of these high-grade cervical lesions, with possible invasion of the cervix and surrounding organs.[12, 15]

The development of cervical cancer is an insidious process that can take a long period of time from the development of its premalignant stage up to the stage in which cancer becomes full-blown. It

is a preventable disease, essentially due to this long drawn-out process, hence vaccination, elimination of risk factors, screening methods and treatment of the pre-invasive cervical lesions are very effective. [4, 12, 15]

2.2 Risk factors for cervical cancer

Following the acquisition of HPV, which is primarily the causative agent for the development of cervical cancer, certain factors indicate if there would be subsequent progression to pre-invasive and invasive cervical lesions. Such factors include multiparity, early primi-gravidity, early sexual debut, cigarette smoking, having a high number of sexual partners and having partners who have multiple sexual partners. Others include HIV infection or other sexually transmitted infections, and immunosuppression due to other diseases.[4, 12, 15]

Other factors that have been highlighted by researchers as risk factors involved in the development of cervical cancer include prolonged use of oral contraceptives ; lack of regular pap tests; previous abnormality or cancer of the cervix; poor nutrition; folate deficiency; genetic predisposition; low socioeconomic status; multiparity, the use of diethystiboesterol; and age; with cervical cancer more preponderant in the elderly than in the younger age group.[4,12,15] This can be expected due to the insidious nature of the disease.

Other risk factors implicated as possible risk factors in the development of cervical cancer include late menopause, herpes, and race, with cervical cancer more common in blacks, Hispanics and American Indian women.[4, 6, 12, 15]

2.3 Demographic characteristics of people having cervical cancer and HPV

In South Africa, about 20 million women are at risk of developing cancer. It is estimated that the crude incidence of cervical cancer is about 30.2/100,000.[2] With regard to the burden of cervical HPV infection among women in South Africa, it is estimated that the prevalence of HPV16 and/

or 18 among women with normal cervical cytology is 3.2% while the prevalence of HPV 16/18 among women with cervical cancer is 64.2%.[2]

In 2012, among people aged 15-19, 2 371 new cases of cervical cancer were diagnosed. The respective figures for women aged 40-64 and women older than 64 were 4 003 and 1 359 respectively.[2]

In the United States, according to the National Health and Nutritional Examination Survey, it was estimated that in 2013-2014, the prevalence of any high-risk genital HPV for adults aged 18–59 was 45.2% and 25.1% in men, and 39.9% and 20.4% in women. The authors also found that prevalence of any and high-risk genital HPV was lower among non-Hispanic Asians and higher among non-Hispanic blacks than in both non-Hispanic whites and Hispanic men and women.[31]

2.4 Human Papilloma Virus vaccination

Advancement in research and medicine have given rise to the development of two types of HPV vaccines that are highly effective against the manifestation of cervical cancer.[4] This includes the bivalent vaccine CervarixTM, that incorporates virus-like particles (VLP), antigens, for oncogenic HPV types 16 and 18; and the quadrivalent vaccine GardasilTM, incorporating virus-like particles (VLP), antigens, for HPV types 16 and 18, and non oncogenic HPV types 6 and 11, which are the most common aetiological agents for genital warts.[4]

In terms of primary prevention of cervical cancer, the use of prophylactic vaccines is said to be the most significant development in the fight against cervical cancer.[4, 5] In view of this fact, HPV vaccination should be advocated for widespread use in the South African population.[4, 5, 14]

With regard to the efficacy of the vaccine, the quadrivalent prophylactic vaccine GardasilTM was found to be 98.6% effective at 3.6 years against HPV 16 and 18, CIN 2 and 3 lesions, and adenocarcinoma.[4] It was also noted to have resulted in significant reductions in colposcopy, cervical biopsy and definitive therapy in addition to cross protection to other vaccine types.[4] With regard to the bivalent vaccine CervarixTM, its protection for HPV CIN 2 lesions was 98.4% and

against CIN 3 lesions was 100%.[4] It provided significant protection against non-oncogenic types such as HPV 33 and 45 . Both varieties of the HPV vaccine have been approved for use in South Africa.[4]

The South African Human Papilloma Virus Advisory Board advocates that there should be universal immunization of young girls before the age of puberty, and that ideally this should be done between the ages of 9-12, where it is expected that girls have not had their sexual debut.[4] These vaccines are found to be extremely safe for use with no serious adverse effects.[4]
The HPV vaccination of young girls has recently been rolled out by the Department of Health in conjunction with the Department of Education in South-Africa. The vaccine is administered in two doses, with the initial injection followed by the second after six months.[9, 14]

The intention is to immunize young girls in grade 4 with the HPV vaccine with the aim of their developing immunity against HPV before they become sexually active. This slightly differs from the recommendation of the South African Human Papilloma Advisory Board's recommendation that there should be universal immunization of young girls before the age of sexual debut, with vaccination preferably between 9 and 12 years of age in three doses commencing at 0, 1-2 months later, and a final dose at 6 months.[4] The advisory board also advocates catch-up vaccination for females aged 13 to 26 years who have not been previously vaccinated .[4]

It is generally accepted that vaccination against HPV is an important primary preventive measure. In terms of secondary prevention of cervical cancer, important methods are screening such as a visual inspection with acetic acid (VIA), visual inspection of the cervix after administration of Lugol's iodine, and ultimately the use of the Pap smear.

2.5 Healthcare workers knowledge of cervical cancer and cervical cancer screening

Several studies indicate that knowledge of cervical cancer and cervical cancer screening amongst health workers is low.[10, 16-19]

In a study conducted in Haiti regarding health care workers knowledge of cervical cancer and screening, the researchers found that 69.2% of respondents did not have adequate knowledge about cervical cancer and cervical cancer prevention. The authors also found that among the participants who were knowledgeable about cervical cancer, 83.3% of those respondents identified HPV infection and multiple partners as risk factors for cervical cancer, while 92% of respondents felt that cervical cancer screening is an essential part of women's health.[10]

In 2012, a survey conducted in Jordan to assess awareness, practice and attitude to cervical Pap smears among female health care workers showed that up to half of the respondents were not aware of the availability of cervical cancer screening.[11]

An older study conducted in Uganda which sought to assess knowledge, attitudes and practices on cervical cancer screening among medical workers, indicated that only 43% of respondents knew the risk factors for cervical cancer, eligibility for cervical cancer screening, and the screening interval; however, 93% of respondents in the study considered cervical cancer as a public health problem .The authors concluded that practical skills training on cervical cancer screening needed to be added to health care workers' training curriculum.[16]

In keeping with the predominant theme of inadequate knowledge of cervical cancer among health care workers, a study that was conducted in Turkey indicated that a large proportion of respondents in the study reported low knowledge of cervical cancer risk and inadequate screening practice. In this study, up to 24% of respondents had not heard of Pap smear testing and up to 40.5% of respondents did not know when one should be having Pap smear tests.[17]

The results obtained in the Turkish study were comparable to those obtained in a study done in Cameroon, in which the researchers concluded that knowledge of cervical cancer and its prevention by screening showed significant deficits, and that a massive amount of awareness had to be generated to ensure that the health care workers were up to date.[18] In this study, only 58% of respondents were able to identify the most important risk factors for cervical cancer; however, 86% of respondents were able to identify cervical cancer as a public health problem. 90% of respondents believed that cervical cancer screening could help prevent cervical cancer, while 84%

of respondents believed that this screening should be done with the aid of a Pap smear. There was a significant discrepancy in the knowledge of cervical cancer among different categories of health care workers, with nurses having the lowest levels of knowledge of cervical cancer and cervical cancer screening.[18]

In a study evaluating knowledge of cervical cancer and its prevention among the nursing staff in a tertiary health institute in Gujarat, India, the researchers found that knowledge of cervical cancer among the health care workers was low, and that the knowledge of cervical cancer and its understanding needed to be improved drastically.[19]

However, a few other studies that were reviewed highlighted fairly high levels of knowledge of cervical cancer screening among respondents.[20,21] In a study conducted in Thailand, the researchers found that knowledge of medical workers about the importance of the Pap test, early detection of cervical cancer, and treatment of early stage cervical cancer was adequate.[20] Another study conducted in Eastern Nigeria, attempted to highlight awareness of health care workers to cervical cancer and cervical cancer screening. The results of the study found that 85% of respondents were aware of cervical cancer and 84.2% were aware of the fact that HPV causes cervical cancer. The authors also found that the awareness of cervical cancer screening was significantly higher than that of the HPV vaccine [OR: 0.17; 95% C.I: 0.09-0.30].[21]

A specific study in Mexico with respondents being family physicians, found that about 95.1% of the family physicians had adequate knowledge about the aetiology and prevention of cervical cancer, while up to 90.3% of the study respondents mentioned the Pap smear as the main method of diagnosis of cervical cancer. The reason adduced through this finding was the fact that the family physicians had gone through several years of training, including the attainment of postgraduate medical qualifications.[22] The authors also found no significant difference in levels of knowledge between doctors working in urban and rural areas, and no significant differences in the levels of knowledge about cervical cancer among females and male participants.[22]

There is an assertion that different categories of health workers might have differing levels of knowledge and awareness of cervical cancer. This premise was supported by a study conducted in

Tanzania, where the inference was that registered nurses seemed to have better knowledge compared to the enrolled nurses participating in the study.[23]

The researchers found that less than half of the respondents in the Tanzanian study had adequate knowledge regarding cervical cancer and that there was a significant association between knowledge levels of causes of cervical cancer and the transmission of HPV, and age. The authors highlighted that the majority of the study respondents did not know the intervals for cervical cancer screening.[23]

2.6 Health care workers knowledge of HPV and HPV vaccination

A variety of studies have been done with objective of analysing the knowledge of health care workers about HPV and HPV vaccination. A study in Cameroon by a group of researchers to determine the level of knowledge, awareness and beliefs of nurses about HPV and HPV vaccines concluded that the respondents had moderately low levels of knowledge regarding HPV infection and the prevention of cervical cancer, and moderately high levels of knowledge about the HPV vaccine. In this study, up to 32% of the respondents failed to identify HPV as a sexually transmitted infection, while up to 43.4% believed that it was an uncommon infection.[24] It was concluded that despite the high levels of knowledge about the vaccine among the nurses, further education was needed to enable the health workers to increase their willingness to offer the vaccines to their patients.[24]

In a 2010 study performed in Turkey among a team of health care workers working in specialties other than obstetrics and gynecology, the researchers found that physicians were more competent regarding the relation of HPV infection to cervical cancer, and were also more aware of the presence and types of HPV vaccine, which could ultimately manifest in a higher degree of willingness to prescribe the vaccine compared to non-physician health care providers.[25]

In another study in which the objective was to determine family physicians' knowledge and attitudes about the HPV vaccine, participants reported a higher intention to recommend both hypothetical HPV vaccine to girls vs. boys $P<0.0001$ and to older vs. younger adolescents $P<0.001$

The authors noted that the variables independently associated with the intention to recommend vaccination included female gender patients, knowledge about HPV, and fewer perceived barriers to vaccination.[26]

According to a study conducted to determine female hospital health care workers knowledge of cervical cancer, HPV and HPV vaccination, only 12%–58.5% had some knowledge of HPV, and less than 50% had knowledge of HPV vaccination. 68%–85.3% of respondents had good knowledge of the Pap smear and cervical cancer. In this study, about 50–60% of the respondents had a good attitude towards HPV vaccination.[27]

In a 2009 study in Thailand conducted among health care workers, Songthap and colleagues set out to determine the knowledge, attitude and acceptability of HPV vaccines among doctors and nurses. They found that knowledge on HPV was at a medium level, with approximately 80% of nurses and 63% of doctors agreeing on the use of the HPV vaccine. However, the nurses had a lower level of knowledge compared to the doctors in the study. The authors also found that about 70% of both doctors and nurses would recommend the HPV vaccine to their clients.[28]

In a study conducted among South African nurses, about three-quarters (73.3%) of the participants were aware of HPV and among them, 38.3% knew that HPV is the most common sexually transmitted virus. Nurses had poor knowledge regarding HPV infection and the HPV vaccine. The majority (90.9%) of the nurses intended to recommend the vaccine to their patients.[32]

In another study conducted in Pretoria, South Africa, the researchers found that majority of the doctors involved in the study were aware of HPV; however they had poor knowledge regarding HPV infection and the HPV vaccine. The authors concluded that there was a knowledge deficit regarding HPV. They proposed further education on safety and efficacy of the HPV vaccine for the doctors and the general public, in order to reduce the burden of cervical cancer .[37]

There is a predominant theme of low level of knowledge of cervical cancer, HPV and HPV vaccination among health care workers. Improving the level of education of health care workers could assist in reducing the burden of cervical cancer especially in resource poor areas. [32, 37]

Although several of the studies assessing health care workers' knowledge pertaining to cervical cancer, HPV and HPV vaccination have been reviewed, there seems to be a void pertaining to this subject, especially among health care workers in resource poor settings such as the North West province of South Africa. This provided the need for the researcher to investigate whether health care workers in this type of setting are knowledgeable about cervical cancer, HPV and HPV vaccination.

2.7 Cervical cancer, HPV infection and HIV

HPV infection has been identified as principal causative factor for a predominant percentage of cervical cancer cases .[1, 2, 3] While several factors such as early coitarche and smoking have being identified as risk factors for the development of cervical cancer, HIV positive status has been established as a significant risk factor in the development of cervical cancer. [33]

It has been proven that women infected with HIV have a significantly higher risk of development of cervical cancer and cervical dysplasia as compared to women who are not infected with HIV.[34] South Africa has the highest number of people living with HIV in the world (an estimate of 5.7 million people aged 15 and above).[35] Of these figure, 3.4 million are women.[35]

In the natural course of HPV infection, a virile immune system is usually sufficient in the clearance of HPV with no further sequelae.[2] It is however of significant importance that HIV positive patient have reduced immunity with subsequent increased susceptibility to the development of cervical cancer due to inability to clear HPV infection.

In view of the above facts, it must be noted that the HIV/AIDS pandemic contributes immensely to the burden of cervical cancer in the country.

This is quite alarming for a country like South Africa that has the largest number of people living with HIV as it denotes the epidemic of cervical cancer that can be unleashed if proper screening and management is not put in place.

Studies have highlighted the fact that there is fivefold to eightfold increased rate of abnormal smears in Human Immunodeficiency Virus-infected women. [36] One in five HIV-infected women with no evidence of cervical disease developed biopsy-confirmed squamous intraepithelial lesions within 3 years. These figures highlight the significant risk of the development of cervical cancer especially to patients living with HIV.[36]

CHAPTER THREE METHODS

This chapter describes the aim, objectives and various components of the study (study design, the setting, the population, the sample size and selection, the procedures undertaken, and the data analysis).

3.1 Aims and Objectives

The aim of the study was to assess the knowledge of primary health care workers in the Mamusa and Naledi sub-districts of the North West Province about cervical cancer, the human papilloma virus and the HPV vaccination.

3.1.2 Objectives

1) To describe the socio-demographic profile of the different categories of primary health care workers in the study sample i.e. doctors, enrolled nurses, professional nurses, and clinical associates.
2) To evaluate if primary health care workers in the Mamusa and Naledi sub–districts have adequate knowledge about cervical cancer.
3) To evaluate if primary health care workers in the Mamusa and Naledi sub-districts have adequate knowledge about the human papilloma virus.
4) To evaluate if primary health care workers in the Mamusa and Naledi sub-districts have adequate knowledge about HPV vaccination.
5) To determine the association between knowledge levels of cervical cancer, HPV and HPV vaccination and the socio-demographic characteristics of the participants.

3.2 Study setting

The study was conducted in the health facilities in Mamusa and Naledi sub-districts of Dr Ruth Segomotsi Mompati District in the North West Province. In the Mamusa sub-district, this comprises a district hospital, one community health centre, and three clinics. These facilities are Schweizer-Reneke District Hospital, Mamusa Community Health Centre, Ipelegeng Clinic and Schweizer-Reneke Town Clinic. In the Naledi sub-district, the facilities in which the study was conducted included the Joe Morolong Memorial Hospital which was an exception as it offered both primary and secondary level of care and Huhudi Community Health Centre.

3.3 Study population

The study population consisted of the different categories of primary health care workers in the health care facilities in the Mamusa and Naledi sub-districts. For the purpose of this study, primary health care workers included categories of healthcare professionals such as doctors, clinical associates, enrolled nurses, enrolled nursing assistants, and professional nurses. Data obtained from the district offices indicated that 200 health workers from the different facilities were eligible for the study. Pharmacists were excluded from the study.

3.4 Sample Size

Using Epi Info Stat Calc, the confidence interval was set at 95% and a sample error of 5% was used with a power of 80%. A power of 80% was chosen because a prior study done in Nigeria estimated the level of knowledge of health care workers about cervical cancer and HPV at 82%.[21]

It had been established that 200 health care workers from all the facilities were eligible for the study, therefore, 200 questionnaires were distributed in these study centres. Return numbered 116 filled -in questionnaires, equating to a 58% response rate. During the study period, 65 health workers in the two sub-districts were on leave and 19 declined to participate in the study.

3.5 Study design

This was a descriptive cross-sectional study.

3.6 Measuring tool

The tool for this particular study was a self-administered questionnaire written in English, as it was expected that the primary health care worker respondents would clearly comprehend what was being asked of them. The questionnaire was adapted from two examples of validated questionnaires, [29, 30] and was divided into three main sections. The first section involved questions that aimed to collect basic socio-demographic data such as age, gender, level of education and

health care worker category. The second section involved questions that assessed the respondent's knowledge about cervical cancer and its prevention. This section was further divided into five sub-sections, with the first sub-section dealing with the respondent's general knowledge on cervical cancer.

The next sub-section included enquiry about the relationship between stated risk factors and the development of cervical cancer; this aspect involved a Likert-like scale with a score of 0 to 2 indicating a weak relationship between the stated risk factors and cervical cancer, and a score of 3 to 5 indicating a strong relationship.

The fourth series sub-sections included questions about the respondent's knowledge of primary and secondary prevention of cervical cancer, with the final subsection containing questions about cytological examination. The total of the number of questions assessing cervical cancer in all the subsections listed above totaled 37.

The final section of the questionnaire involved assessment of the primary health care workers' knowledge of the human papilloma virus and the HPV vaccine respectively.

The aspect of the questionnaire testing the knowledge of primary health care workers about cervical cancer was derived from a slightly modified version of Cervical-Cancer-Knowledge-Prevention-64 (CCKP- 64) questionnaire was created by researchers in Poland for the purpose of testing the knowledge of respondents about cervical cancer and its prevention.[29]

In the original CCKP-64 questionnaire, students were used for the study population. Due to this fact, certain aspects of the sociodemographic data were removed for the purpose of this study: for example, questions about the type of school /university attended. These questions were replaced by health care worker categories. Other details added to the socio-demographic section included race and highest level of education. Further changes involved the necessary replacement of 'Poland' with 'South Africa' in the body of the questionnaire.

For assessment of the knowledge of primary health care workers about HPV and HPV vaccination, this aspect of the questionnaire was derived from previous work done by researchers in Australia.[30] Permission was sought and received from both authors for the use of their questionnaire.

3.7 Data collection

Data collection commenced after ethical approval for the study was obtained from the Human Research Ethics Committee (Medical) of the University of the Witwatersrand. Permission was obtained from the District Research Committee and the Sub-district managers in charge of the facilities that were included in the study.

Data collection took place between 25 September 2016 and 1 November 2016. Team meetings in which a large proportion of the primary health care workers were available were targeted in conjunction with clinic and hospital management to ease the problem of availability of health workers for data collection i.e. for nurses, changeover of duty takes place in most of the facilities on Thursdays. Upon permission being obtained from the respective unit managers, the group of nurses were approached.

The other categories of primary health care workers, such as the doctors and clinical associates, who were not as numerous as the nursing group, were approached individually. Primary health care workers were approached during a time convenient to them i.e. break time, so as not to impair the delivery of services in the facilities. A participant information sheet was given to the primary health workers prior to their receiving the questionnaires. This informed them about the study, the questionnaire and what would be expected of them in terms of their participation. The researcher informed all the primary health care workers that the information they provided would be treated with confidentiality. Primary health care workers were encouraged to fill in the questionnaires immediately, and the forms were collected by the researcher. However, for those who could not fill in the forms immediately, a sealable envelope was given them for the completed questionnaires in order to ensure confidentiality and safety of the documents.

Questionnaires were then deposited in a sealed box placed in the wards of each institution, under the custodianship of unit managers who had the researcher's permission and mandate to ensure the safety of the sealed submission boxes. The boxes had an opening for the insertion of the sealed questionnaires and once inserted, could be retrieved only by the researcher.

The primary health care workers were informed of the location of the sealed submission boxes. The questionnaires were kept in safety by the researcher upon their retrieval from the boxes. The data obtained from the questionnaires was then transferred to an MS Excel spreadsheet on the researcher's computer, which was password-protected.

3.8 Data Analysis

Data was transferred to an MS Excel spreadsheet on the researcher's computer, with coding done for categorical data. A total of 37 questions assessed respondents' knowledge of cervical cancer, with their ability to answer 70 % of the questions correctly taken to mean that their level was adequate. The cut-off of 70% was chosen because a prior study done in Thailand estimated that the knowledge level of health care workers about cervical cancer and the Papanicolaou smear was between 68-85%.[27]

Those respondents who answered less than 70% of this study's questions correctly were deemed to have inadequate knowledge. The aspect of the questionnaire that tested for knowledge on HPV consisted of 22 questions in total. Adequate knowledge of HPV entailed primary health care workers answering 80% of the questions correctly i.e. 17 questions.

The aspect that tested the knowledge of primary health care workers regarding HPV vaccination entailed seven questions. Adequate knowledge of HPV vaccination involved answering 70% of the questions correctly i.e. five questions.

Data from the MS-Excel spreadsheet was imported to the statistical software (STATA vs. 14) for analysis. Categorical variables such as gender and job designation was analysed, with results presented as frequencies and percentages. Continuous variables such as age were presented as means and standard deviations.

Fisher's exact test and the chi square test were used in the comparison of variables. P value of < 0.05 was considered significant.

3.9 Ethics

The researcher obtained ethical clearance from the Human Research Ethics Committee (Medical) of the University of Witwatersrand (Certificate number M160312) to conduct the study.
Permission was then sought and received from the District Research Committee and the sub-district managers in charge of the respective facilities that were chosen for the study.
A participant information sheet (Appendix B) was given to respondents to educate them about the study. Confidentiality and anonymity were maintained by ensuring that all completed questionnaires were kept under lock and key. Only those respondents who agreed to participate in the study took part; those who declined were not forced or coerced. Their right to refuse was respected.

3.10. Funding

The research was self-funded.

CHAPTER FOUR RESULTS

This chapter presents the results of the data that was collected during the months of September to November 2016.

4.1. Methodology

A total of 200 questionnaires were distributed among primary health care workers in the Mamusa and Naledi sub-districts. A total of 116 were returned by participants from all the facilities and were then analysed.

4.2. Demographics of the respondents

Table 4.1: Socio-demographics characteristics of the respondents

Characteristics	**Frequencies (N=116)**	**Percentages (%)**
Age distribution of respondents		
< 30	29	25
30-39	49	42.2
40-49	27	23.3
50-59	11	9.5
Percentage of respondents by gender		
Male	30	26
Female	86	74
Distribution by race		
Black	107	92
Coloured	6	5.2
White	2	1.7
Indian	1	0.9
Distribution by institution		
Schweizer – Reneke District Hospital	39	33.6
Joe Morolong Memorial Hospital	31	26.7
Huhudi Community Health Centre	24	20.7
Mamusa CHC	12	10.3
Ipelegeng Clinic	6	5.2
Schweizer Reneke Town Clinic	4	3.4

Distribution by Professional category		
Enrolled Nursing assistant	19	16.4
Enrolled Nurse	21	18.6
Professional Nurse	67	57.8
Clinical Associate	3	2.6
Doctor	6	5.2
Highest Level of Education		
Less than Matric	5	4.3
Matric	28	24.1
Diploma	58	50
Certificate	3	2.6
Degree	22	19

A majority of the respondents were in the 30–39 age group (42.2%, n=49/116). The mean age of the respondents was 36.6 ± 8.7 years. Female respondents made up 74% (n=86/116) of the study population. As seen in Table 4.1 above, the largest proportion of the respondents were black (n= 107/116, 92.2%)**.** The majority of respondents worked at Schweizer-Reneke District Hospital (n=39/16, 33.6%).

With regard to the distribution of the health care workers according to their professional category, most respondents were in the professional nurse category (n=67, 57.8%). With regard to levels of education, largest proportion of respondents were those with diplomas (n=58, 50%), followed by those with a matric (n =28, 24.1%).

4.3. Knowledge of primary health care workers about cervical cancer

4.3.1. General knowledge about cervical cancer

Table 4.2: General knowledge about Cervical Cancer

Questions	Yes	No	I don't know
Have you heard about cervical cancer?	116 (100%)	0 (0 %)	0 (0%)
Can cervical cancer be a terminal illness?	112 (96.5%)	2 (1.72%)	2 (1.72%)
Can cervical cancer be associated with an infection?	91 (78.4%)	20 (17.2%)	5 (4.3%)
Is there an effective method that significantly reduces the risk of this disease?	105 (90.5%)	7 (6%)	4 (3.4%)
Have you ever had direct contact with the disease?	43 (37%)	62 (53.4%)	11 (9.4%)
Do you think this disease can affect you in future?	64 (55.1%)	32 (27.6%)	30 (27.5%).

All respondents in the study had heard of cervical cancer (n= 116,100%). 96.5% of the respondent felt that it was a terminal illness.

About 17.2% (n= 20) of respondents did not think that cervical cancer could be associated with an infection.

A large proportion of respondents (90.5%) felt that there was an effective method that could help reduce the risk of the disease.

4.3.2. Relationship between estimated risk factors and occurrence of cervical cancer.

Table 4.3: The relationship between risk factors and the occurrence of cervical cancer

RISK FACTORS	WEAK RELATIONSHIP	STRONG RELATIONSHIP
YOUNG AGE	75% n= 82	25% n= 28
GENETIC FACTORS	13% n= 13	87% n= 97
HPV	13% n= 14	87% n= 94
HIV	11% n= 12	89% n=100
MULTIPLE SEXUAL PARTNERS	6% n= 6	94% n= 104
EARLY SEXUAL INTIATION	12% n=12	88% n= 92
HISTORY OF STDS	9% n=10	91% n=98
ALCOHOL ABUSE	69% n=77	31% n=38
SMOKING	36% n=41	64% n=73
MISCARRIAGES	38% n=42	62% n=67
MULTIPARITY	31% n=34	69% n=70
EARLY MENARCHE	68% n=78	32% n=36
USE OF CONDOMS	91% n=103	9% n=10
HORMONAL CONTRACEPTION	70% n=73	30% n=31
BREASTFEEDING	85% n= 98	15% n=17
USE OF PSYCHOACTIVE SUBSTANCE	77% n=83	23% n=25
USE OF PUBLIC SWIMMING POOL	93% n=100	7% n=14

The majority of respondents correctly identified the strong relationship between HPV, HIV, multiple sexual partners and early sexual debut with the occurrence of cervical cancer. 87%, 89%, 94% and 88% of the respondents respectively, correctly identified these risk factors as having a strong relationship to the development of cervical cancer. 93% of respondents identified the use

of a public swimming pool as having a weak relationship to the development of cervical cancer, however, about a third of the respondents didn't know about the strong relationship between smoking and the development of cervical cancer. About two thirds of the respondents also thought that early menarche had a weak relationship to the development of cervical cancer.

4.3.3. Knowledge about primary prevention of cervical cancer

4.3.3.1 Lifestyle

Table 4.4: Knowledge of risk factors for the development of cervical cancer

	Yes	%	No	%	I don't know	%
A diet rich in anti-oxidants	**54**	**(47%)**	**26**	**(22%)**	**36**	**(31%)**
Regular physical exercise	**72**	**(63%)**	**35**	**(30%)**	**8**	**(7%)**
Use of vitamin supplements	**55**	**(49%)**	**44**	**(39%)**	**13**	**(12%)**
Proper long and relaxing sleep	**53**	**(47%)**	**40**	**(35%)**	**20**	**(18%)**
Avoiding highly processed food	**46**	**(41%)**	**36**	**(32%)**	**30**	**(27%)**
Weight loss	**34**	**(31%)**	**62**	**(56%)**	**15**	**(13%**
Restraint from casual sex	**84**	**(76%)**	**22**	**(20%)**	**4**	**(4%)**

Table 4.4 above demonstrates that a large proportion of the respondents (63%) felt that regular physical exercise could reduce the risk of developing cervical cancer, and about half the respondents felt that use of vitamin supplements could reduce the risk of developing cervical cancer.

4.3.3.2. Vaccines

Table 4.5: Knowledge about primary prevention of cervical cancer (Vaccines)

	Yes	No	I don't know
Have you heard about the vaccine against cervical cancer?	**74 (65%)**	**29 (26%)**	**10 (9%)**
If such a vaccine exists, is it available in South Africa?	**83 (72%)**	**11 (10%)**	**22 (19%)**
Is it free of charge?	**73 (63%)**	**18 (16%)**	**25 (21%)**
Does it guarantee 100% protection from cervical cancer?	**11 (10%)**	**70 (60%)**	**35 (30%)**
Do you know where to get vaccinated?	**79 (68%)**	**17 15%)**	**20 (17%)**
Have you ever been vaccinated?	**9 (8%)**	**96 (83%)**	**11 (9%)**

As seen in Table 4.5 above, a majority of the study participants had heard about the vaccine against cervical cancer (65% n= 74/113) however, up to 19 % (n= 22/116) of the respondents were not aware of its availability in South Africa. A large proportion of the health care workers had not been vaccinated against cervical cancer 83% n= 96/116).

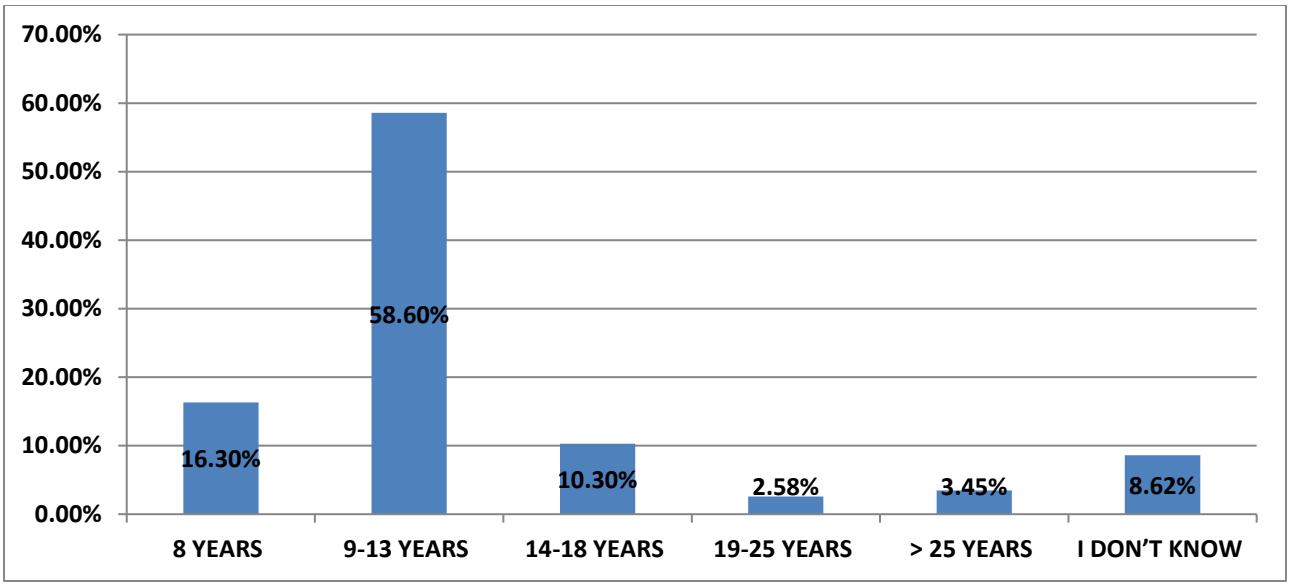

Figure 4.1: Ideal age reported by participants for HPV vaccination

In Figure 4.1 above, the majority of respondents (n= 68,58.6%) correctly indicated that the vaccine for primary prevention of cervical cancer should be administered between the ages of 9-13 years. 16.3 % of the respondents felt that the age for administration of the vaccine should be 8 years. 8.6% of the respondents did not know the recommended age for vaccination.

4.3.4. Knowledge about secondary prevention of cervical cancer

Table 4.6: Knowledge of secondary prevention of cervical cancer reported by participants

	Yes	%	No	%	I don't know	%
Lack of symptoms from genital areas	**39**	**(35%)**	**62**	**(55%)**	**12**	**(10%)**
Painful menstruation	**82**	**(73%)**	**25**	**(22%)**	**4**	**(5%)**
Intensive /intermenstrual bleeding	**95**	**(84%)**	**14**	**(12%)**	**4**	**(4%)**
Irregular menstruation/ lack of menstruation	**84**	**(72%)**	**26**	**(23%)**	**6**	**(5%)**
Smelly vaginal discharge	**97**	**(87%)**	**11**	**(10%)**	**3**	**(3%)**
Itchy rash in the genital area	**79**	**(68%)**	**34**	**(29%)**	**3**	**(3%)**
Bleeding after intercourse	**99**	**(88%)**	**7**	**(6%)**	**7**	**(6%)**
High fever	**62**	**(54%)**	**33**	**(29%)**	**19**	**(17%)**

In Table 4.6 above, a large majority of the respondents (73%) felt that painful menstruation was a common symptom of cervical cancer, while up to 88% of respondents felt that post-coital bleeding was an important symptom of cervical cancer.

4.3.5. Knowledge of Pap smear / cytological examination

Table 4.7: Knowledge of the pap-smear /cytological examination reported by participants

	Yes	No	I don't know
Have you heard of pap smear?	**108 (96%)**	**4 (4%)**	**0 (0%)**
Is it a test that gives you 100% chance of early diagnosis?	**100 (89%)**	**12 (10%)**	**1 (1%)**
Is the test painful?	**13 (12%)**	**89 (79%)**	**10 (9%)**
Is it a time-consuming test?	**24 (22%)**	**83 (75%)**	**4 (3%)**
In South Africa, is it possible to be tested free of charge?	**112 (99%)**	**1 (1%)**	**0 (0%)**
Does having the test done eliminate the lifetime risk of cervical cancer?	**22 (19%)**	**92 (81%)**	**0 (0%)**
Can the test cause serious complications?	**6 (5%)**	**102 (90%)**	**5 (5%)**
Is it possible for the Pap smear to increase your chances of cervical in the future?	**8 (7%)**	**99 (88%)**	**5 (5%)**

96% of the respondents (n=108) in Table 4.7 above had heard of the Pap smear, while up to 12% of respondents felt that it was a painful test.

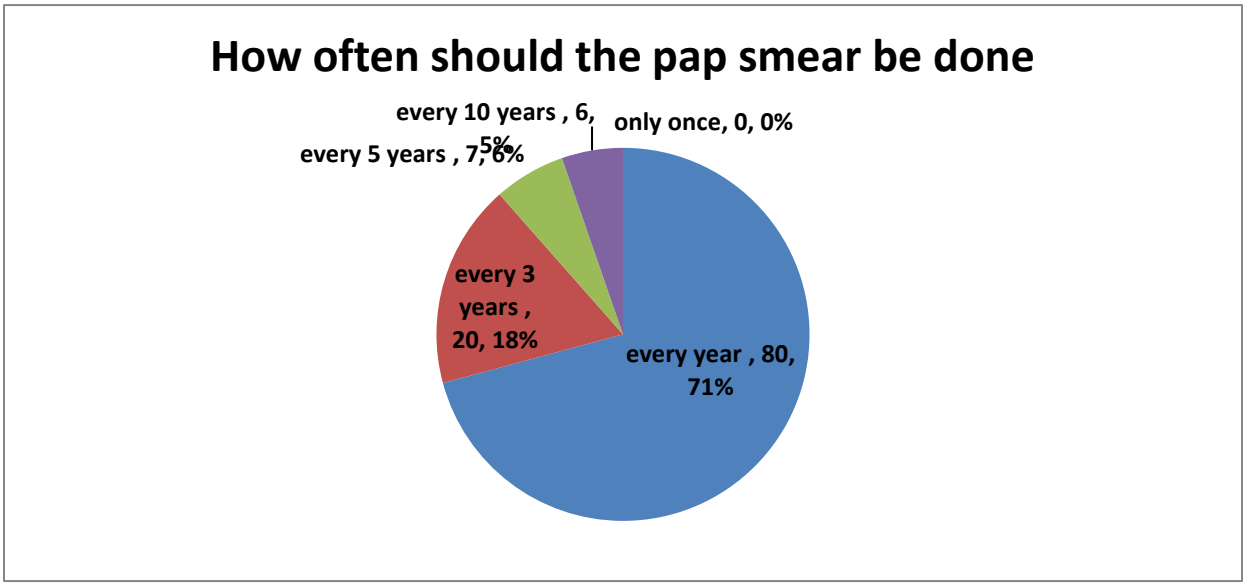

Figure 4.2: Time interval for doing the Pap test

It is demonstrated in the above Figure that about 71% of the respondents felt that the Pap test should be done annually.

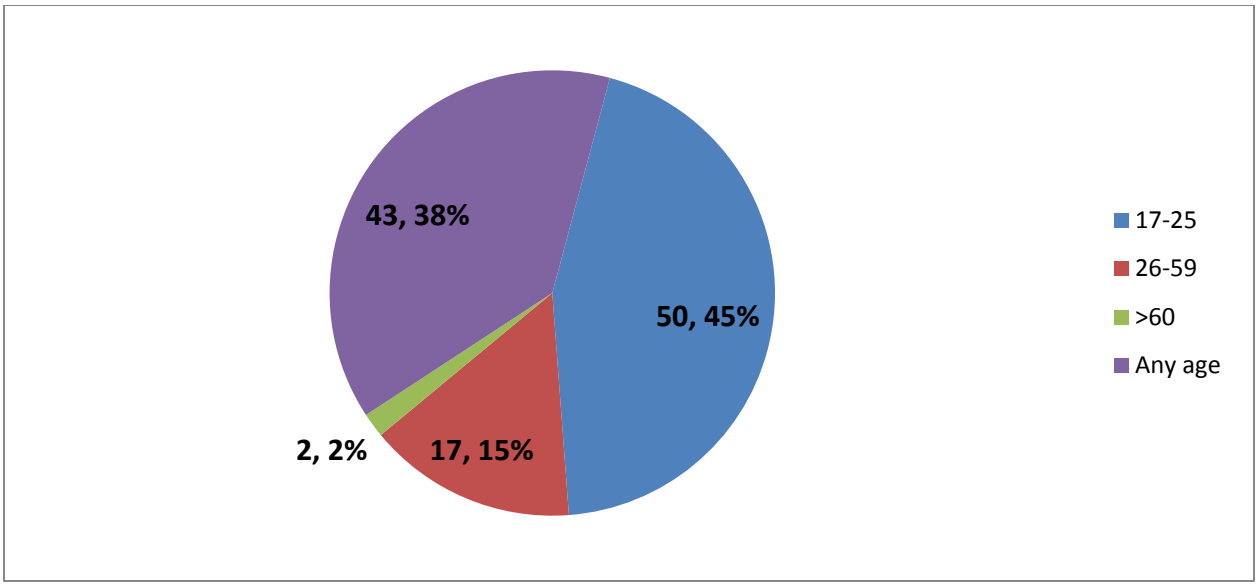

Figure 4.3: Age at which women should take the Pap smear

About 43% of the respondents felt that the Pap test can be done at any age, as shown in Figure 4.3 above.

Table 4.8: Time at which a woman should undergo the Pap smear after sexual debut

	< I year	1-3years	4-6 years
How long after sexual debut should women undergo the pap test?	**79 (72%)**	**26 (24%)**	**5 (4%)**

Table 4.8 above shows that 72% (n= 79) of the respondents felt that women should undertake the pap smear test within a year after sexual debut.

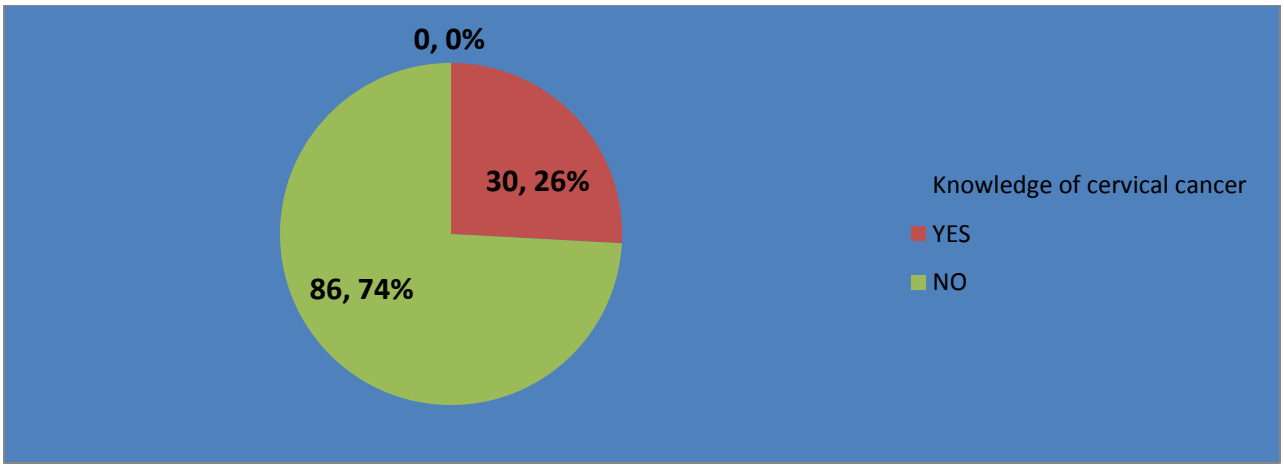

Figure 4.4: Participants' knowledge of cervical cancer

Only 26% (30/116) of the respondents had adequate knowledge about cervical cancer.

4.3.5.1. Source of information about cervical cancer

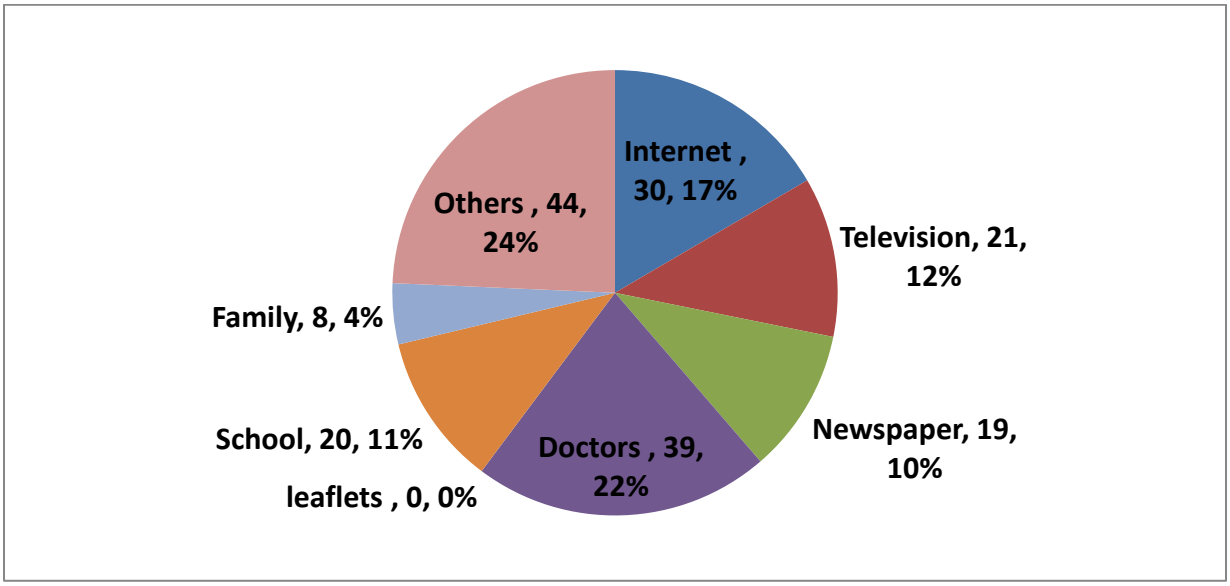

Figure 4.5: Source of information about cervical cancer

With regard to the source of information about cervical cancer, the majority of respondents in Figure 4.5 obtained their information from various sources other than the ones listed in the questionnaire. This was followed by respondents receiving information about cervical cancer from the doctors. Other sources of information about cervical cancer chosen by the respondents included the internet, television, schools and newspaper

4.4. Knowledge of the Human papilloma virus (HPV)

Table 4.9: Knowledge of HPV

	True		False	
HPV is very rare	**25**	**(23%)**	**84**	**(77%)**
HPV has visible signs or symptoms	**63**	**(59%)**	**43**	**(41%)**
HPV can cause cervical cancer	**94**	**(88%)**	**13**	**(12%)**
HPV can be passed on by genital skin-to-skin contact	**84**	**(78%)**	**24**	**(22%)**
There are many types of HPV	**85**	**(79%)**	**23**	**(21%)**
HPV can cause HIV/AIDS	**39**	**(35%)**	**71**	**(65%)**
HPV can be passed on during sexual intercourse	**84**	**(81%)**	**20**	**(19%)**
HPV can cause genital warts	**85**	**(79%)**	**23**	**(21%)**
Men cannot get HPV	**23**	**(21%)**	**86**	**(79%)**
Using condoms reduces the risk of getting HPV	**80**	**(74%)**	**28**	**(26%)**
HPV can be cured with antibiotics	**33**	**(32%)**	**71**	**(68%)**
Having many sexual partners increases the risk of getting HPV	**98**	**(91%)**	**10**	**(9%)**
HPV usually doesn't need any treatment	**23**	**(21%)**	**86**	**(79%)**
Most sexually active people will get HPV at some point in their lives	**83**	**(78%)**	**24**	**(22%)**
A person could have HPV for many years without knowing it	**94**	**(85%)**	**16**	**(15%)**
Having sex at an early age increases the risk of getting HPV	**95**	**(88%)**	**13**	**(12%)**
An HPV test can show for how long you have had an HPV infection	**38**	**(36%)**	**69**	**(64%)**
If a woman tests positive for HPV she will definitely get cervical cancer	**61**	**(55%)**	**50**	**(45%)**
An HPV test can be done at the same time as a [Pap test/Smear test/Pap smear test]	**75**	**(69%)**	**34**	**(31%)**
HPV testing is used to indicate if the HPV vaccine is needed	**50**	**(47%)**	**56**	**(53%)**
When you have an HPV test, you get the results the same day	**22**	**(21%)**	**83**	**(79%)**
If an HPV test shows that a woman does not have HPV, her risk of cervical cancer is low	**73**	**(68%)**	**34**	**(32%)**

59% of the respondents felt that HPV has visible signs and symptoms, while up to 32% felt it could be cured by antibiotics.

4.5. Knowledge of HPV vaccination

With regard to knowledge of HPV vaccination among respondents in the study, results showed that 67.2% (n = 78) had adequate knowledge regarding HPVvaccination compared to 32.8% (n=38) who had inadequate knowledge of HPV vaccination.

Table 4.10: Knowledge of HPVvaccination

	True	False
HPV vaccination requires two doses	**67 (61%)**	**43 (39%)**
The HPV vaccine offers protection against all sexually transmitted infections	**23 (21%)**	**88 (79%)**
The HPV vaccine is most effective if given to people who have never had sex	**82 (76%)**	**26 (24%)**
Someone who has had HPV vaccination cannot develop cervical cancer	**20 (19%)**	**88 (71%)**
The HPV vaccine offers protection against most cervical cancers	**68 (62%)**	**41 (38%)**
One of the HPV vaccines offers protection against genital warts	**61 (57%)**	**46 (43%)**
Girls who have had the HPV vaccination do not need a [Pap test/Smear test/Pap smear test] when they are older	**7 (6%)**	**103 (94%)**

Table 4.10 above shows that 21% of the respondents believed that HPV vaccination offers protection against all sexually transmitted infection.

4.6. Participants' knowledge on cervical cancer, HPV and HPV vaccination

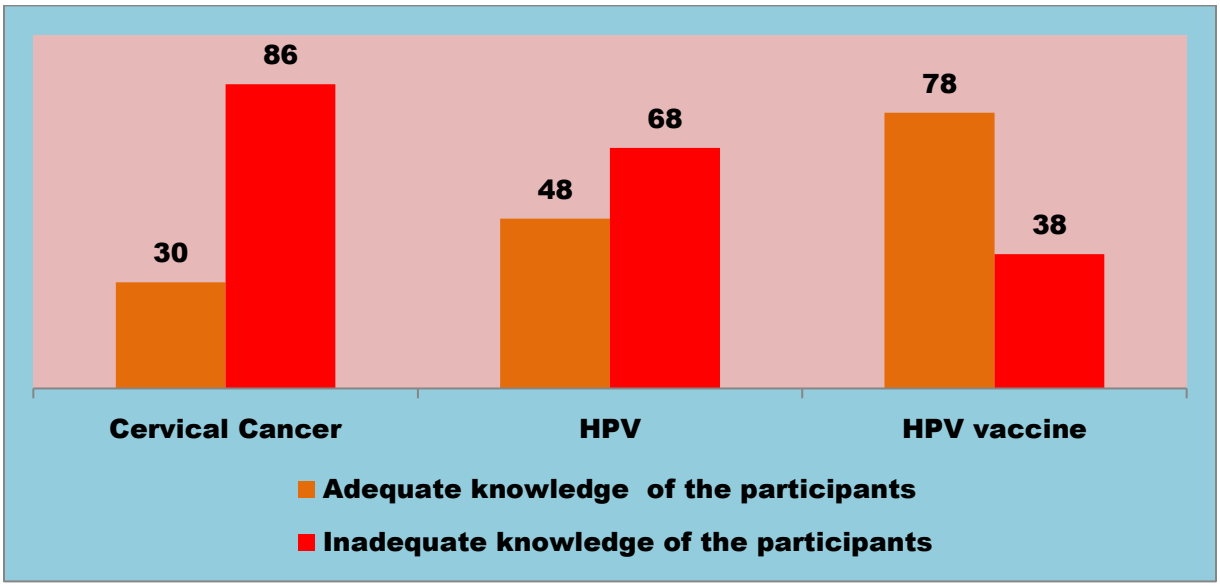

Figure 4.6: Participants' knowledge on cervical cancer, HPV and HPV vaccination

In this study, 26% (30/116) of participants had adequate knowledge of cervical cancer. Adequate knowledge of HPV was seen in 41% of the participants (48/116) and 67% of the participants had adequate knowledge of the HPV vaccine (78/116).

4.7. Association between knowledge of cervical cancer, HPV, HPV vaccination and sociodemographic characteristics.

Table 4.11: Correlation of knowledge level of cervical cancer with health care category

	Inadequate knowledge N= 86	**Adequate knowledge N= 30**	**p=0.016**
Enrolled nursing assistant n=19	**17 (89%)**	**2 (11%)**	
Enrolled nurse n= 21	**16 (76%)**	**5 (24%)**	
Professional nurse n= 67	**50 (75%)**	**17 (25%)**	
Clinical associate n= 3	**2 (67%)**	**1 (33%)**	
Doctor n=6	**1 (17%)**	**5 (83%**	

Chi square test p= 0.016

Table 4.11 above shows that doctors were more knowledgeable about cervical cancer compared to enrolled nursing assistants (Table 4.11)

Table 4.12: Correlation of knowledge of cervical cancer with highest level of education

	Inadequate Knowledge N= 86	**Adequate knowledge N= 30**	**p=0.014**
Less than matric n=5	**5 (100%)**	**0 (0%)**	
Matric n= 28	**25 (89%)**	**3 (11%)**	
Diploma n= 58	**43 (74%)**	**15 (26%)**	
Certificate n= 3	**1 (33%)**	**2 (67%)**	
Degree n=6	**12 (55%)**	**10 (45%**	

Chi square test p= 0.014

Less than a matric qualification was synonymous with lack of knowledge about cervical cancer (Table 4.12).

Table 4.13: Correlation of knowledge of cervical cancer and age group

	INADEQUATE KNOWLEDGE N= 86	**ADEQUATE KNOWLEDGE N= 30**	**p=0.164**
Less than 30 n=29	**22 (76%)**	**7 (24%)**	
30-39 n= 49	**32 (65%)**	**17 (35%)**	
40-49 n= 27	**24 (89%)**	**3 (11%)**	
➢ **50 n= 11**	**8 (73%)**	**2 (27%)**	

Chi square test p= 0.164

Respondents in the age group 40-49 had a significant proportion without adequate knowledge about cervical cancer compared to the other age groups (Table 4.13).

Table 4.14: Correlation of knowledge of cervical cancer and place of work

	INADEQUATE KNOWLEDGE N=86	**ADEQUATE KNOWLEDGE N=30**	**P value p =0.044**
	n (%)	**n (%)**	
Schweizer-Reneke District Hospital: n= 39	**24 (61)**	**15 (38)**	
Joe Morolong Memorial Hospital: n= 31	**23 (74)**	**8 (26)**	
Huhudi Community Health Centre: n=24	**23 (4)**	**1 (4)**	
Mamusa Community health centre: n=12	**9 (75)**	**3(25)**	
Ipelegeng clinic: n=6	**4 (67)**	**2 (33)**	
Schweizer-Reneke Town Clinic: n=4	**3 (75)**	**1(25)**	

Chi square test p= 0.044

The largest proportion of staffers at Joe Morolong Memorial Hospital had less than adequate knowledge of cervical cancer compared to the other institutions (Table 4.14).

Table 4.15: Correlation of knowledge level of HPV with health care worker category

	INADEQUATE KNOWLEDGE N=68	**ADEQUATE KNOWLEDGE N=48**	**P value**
Enrolled nursing assistant: n=19	**13 (68)**	**6 (32)**	**p <0.001**
Enrolled nurse: n=21	**20 (95)**	**1 (5)**	
Professional nurse: n=67	**35 (52)**	**32 (48)**	
Clinical associate: n=3	**0 (0)**	**3 (100)**	
Doctor: n=6	**0 (0)**	**6 (100)**	

Fisher exact test P value < 0.0001

As shown in Table 4.15, doctors were more knowledgeable about HPV than other health care worker categories.

Table 4.16: Correlation of knowledge of HPV and highest level of education

	INADEQUATE KNOWLEDGE n=68	ADEQUATE KNOWLEDGE n= 48	P value = 0.001
< than Matric: n=5	4 (80)	1 (20	
Matric: n= 28	23 (81)	5 (19)	
Diploma: n=58	34 (59)	24 (41)	
Certificate: n=3	1 (33)	2 (67)	
Degree: n= 22	6 (27)	16 (73)	

Fisher exact test p=0.001

There was significant association between knowledge of HPV and the highest level of education (p =0.001). Degree holders had significantly more knowledge of HPV compared to those with a matric certificate. (Table 4.16).

Table 4.17: Correlation of knowledge of HPV and age group

AGE GROUP	INADEQUATE KNOWLEDGE	ADEQUATE KNOWLEDGE	P value
	n (%)	n (%)	p =0.375
< than 30: n= 29	13 (45)	16 (55)	
30-39: n=49	30 (61)	19 (39)	
40-49: n= 27	18 (67)	9 (33)	
50-59: n= 11	7 (64)	4 (36)	

Fischer exact test p= 0.375

In Table 4.17, the younger age group had more knowledge compared to the other age groups.

There was no association between knowledge of HPV and gender (p= 0.123), race (p= 0.587) and place of work (p= 0.141).

Table 4.18: Correlation of knowledge of HPV vaccination and health care worker category

	INADEQUATE KNOWLEDGE	ADEQUATE KNOWLEDGE	P value
	n (%)	N (%)	p =0.043
Enrolled nursing assistant: n= 19	7 (37)	12 (63)	
Enrolled nurse= 21	11 (52)	10 (48)	
Professional nurse: n= 67	18 (27)	49 (73)	
Clinical associate: n= 3	2 (67)	1 (33)	
Doctor: n= 6	0 (0)	6 (100)	

Fisher exact test p= 0.043

In Table 4.18, doctors had more knowledge of HPV vaccination (100%) compared to enrolled nurses (48%) and enrolled nursing assistants (64%). There was a significant association between knowledge of HPV vaccination and the health care worker category (p= 0.043).

Table 4.19: Correlation of knowledge of HPV vaccination and place of work

	INADEQUATE KNOWLEDGE	**ADEQUATE KNOWLEDGE**	**P value p =0.002**
	n (%)	**n (%)**	
Schweizer-Reneke District Hospital: n= 39	**13 (33)**	**26 (67)**	
Joe Morolong Memorial Hospital: n= 31	**14 (45)**	**17 (55)**	
Huhudi Community Health Centre: n=24	**1 (4)**	**23 (96)**	
Mamusa Community Health Centre: n=12	**7 (58)**	**5(42)**	
Ipelegeng clinic: n=6	**1 (17)**	**5 (83)**	
Schweizer Reneke Town Clinic: n=4	**2 (50)**	**2(50)**	

Fisher exact test p= 0.002

There was also a significant association between knowledge of HPV vaccination and the respondents' place of work (p= 0.002). Health care workers at Joe Morolong Memorial Hospital had more knowledge of HPV vaccination compared to that in the hospitals (Table 4.19).

Table 4.20: Correlation of knowledge of HPV vaccination and highest level of education

	INADEQUATE KNOWLEDGE	**ADEQUATE KNOWLEDGE**	**P value p =0.010**
	n (%)	**N (%)**	
< than Matric: n=5	**3 (60)**	**2 (40)**	
Matric: n= 28	**13 (46)**	**15 (54)**	
Diploma: n= 58	**14 (24)**	**44 (76)**	
Certificate=3	**3 (100)**	**0 (0)**	
Degree: n=	**5 (23)**	**17 (77)**	

Fischer exact test p= 0.010

There was a significant association between knowledge of HPV vaccination and the highest educational level attained by the respondents (p= 0.010). Respondents with a higher educational attainment had more knowledge regarding HPV vaccination compared to those with less educational attainment (Table 4.20).

4.8: Logistic regression of socio-demographic factors having significant association with knowledge of cervical cancer

Table 4.21: Logistic regression of socio-demographic factors having significant association with knowledge of cervical cancer

Variables	Odds ratio	P value	95% Confidence interval
Place of work			
JMMH	**0.5565217**	**0.265**	**0.1984451 - 1.560716**
HUHUDI CHC	**0.0695652**	**0.013**	**0.0084891 - 0.5700629**
MCHC	**0.5333333**	**0.398**	**0.1242049 - 2.290123**
IPELEGENG CLINIC	**0.8**	**0.810**	**0.1301618 - 4.916959**
SRTC	**0.5333333**	**0.601**	**0.0506951 - 5.610887**
Different categories of health workers			
Enrolled nurse	**2.65625**	**0.281**	**0.4496259 - 15.6923**
Professional nurse	**2.89**	**0.184**	**0.6042122 - 13.82312**
Clinical Associate	**4.25**	**0.313**	**0.25529 - 70.75287**
Doctor	**42.49999**	**0.005**	**3.158784 - 571.818**
Educational background			
Matric	**0.144**	**0.009**	**0.0333642 - 0.6215053**
Diploma	**0.4186047**	**0.096**	**0.1502616 - 01.166165**
Certificate	**2.4**	**0.500**	**0.188727 - 030.52028**

Health care workers at Huhudi CHC had 6.9% less knowledge of cervical cancer compared to workers at Schweizer-Reneke DH, (odds ratio 0.0695652, p value 0.013, 95% CI 0.0084891 - 0.5700629), as shown in Table 4.21.

Doctors were 42.5 times more knowledgeable about cervical cancer when compared to enrolled nursing assistants. This association was strongly significant with a p value of 0.005, odds ratio of 42.49 and a 95% confidence interval of [3.158784 - 571.818].

With regard to levels of education, only participants with matric qualification demonstrated a statistically significant association with knowledge of cervical cancer. This group of participants were found to be 14.4% less knowledgeable on cervical cancer compared to participants with less than matric qualification, (odds ratio 0.144, p value 0.009 and 95% CI of 0.0333642 - 0.6215053).

Table 4.22: Logistic regression of socio-demographic factors with significant association with knowledge of HPV

	Odds ratio	P value	95% Confidence interval
Different categories of health workers			
Enrolled nurses	**0.1083333**	**0.051**	**0.0116584 – 1.006666**
Professional nurses	**1.980952**	**0.215**	**0.67299 – 5.830952**
Enrolled nursing assistant	**1**	**-**	**-**
Clinical Associate	**1**	**-**	**-**
Educational status of the health workers			
Matric	**0.8695652**	**0.909**	**0.0792622 – 9.539774**
Diploma	**2.823529**	**0.366**	**0.2967815 – 26.86259**
Certificate	**8**	**0.210**	**0.3101215 – 206.3707**
Degree	**10.66667**	**0.052**	**0.983533-115.6827**

In Table 4.22, there was no statistically significant association between HPV knowledge and health care worker category and level of education of health care worker when applying logistic regression analysis.

Table 4.23: Logistic regression of socio-demographic factors with significant association with knowledge of HPV vaccination

	Odd ratio	P value	95% Confidence interval
Place of work			
JMMH	**0.6071429**	**0.314**	**0.2298373 - 1.603841**
HUHUDI CHC	**11.49999**	**0.023**	**1.394361 - 94.84619**
MCHC	**0.3571429**	**0.128**	**0.0947618 - 1.346017**
IPELEGENG CLINIC	**2.5**	**0.424**	**0.2640554 - 23.66927**
SRTC	**0.5**	**0.512**	**0.0630959 - 3.962224**
Different categories of health workers			
Enrolled nursing assistant	**1**	**-**	**-**
Enrolled Nurse	**0.530303**	**0.326**	**0.1495514 - 1.880432**
Professional Nurse	**1.587963**	**0.400**	**0.5406886 - 4.663732**
Clinical Associate	**0.2916668**	**0.348**	**0.0222095 - 3.830314**
Doctors	**1**	**-**	**-**
Educational status			
Less than matric	**1**	**-**	**-**
Certificate	**1**	**-**	**-**
Matric	**1.730768**	**0.579**	**0.2494113 - 12.01051**
Diploma	**4.714282**	**0.107**	**0.7139296 - 31.12975**
Degree	**5.099996**	**0.119**	**0.6576738 - 39.54841**

Health care workers at Huhudi CHC were 11.5 times more knowledgeable about HPV vaccination compared to workers at SRDH, (odds ratio 11.49999, p value 0.023, 95%, CI 1.394361 – 94.84619). No statistically significant associations were detected with other places of work and knowledge of HPV vaccination when using logistic regression.

There was no statistically significant association between knowledge of HPV vaccination and health care worker category and level of education of the health workers when using logistic regression (Table 4.23).

CHAPTER FIVE DISCUSSION

5.1. Discussion

This chapter discusses the results of this study extensively in relation to other articles/studies. The purpose of the study was to determine if primary health care workers in the Mamusa and Naledi sub-districts had adequate knowledge of cervical cancer, HPV and HPV vaccination (Pertinent observations derived from the study are examined in this chapter.

5.2 Sociodemographic characteristics

In terms of the ages of the study respondents, it was noted that the majority fell in the 30-39 age group (n= 49, 42.2%). A significant proportion of the study population was observed to be those in the < 30 age group to those in the age group 40-49 years. This observation was expected as these age ranges generally form the bulk of working-class age groups. The mean age of the respondents in the study was 36. This was similar to the mean age of the respondents in other similar studies, in which mean ages were 34, 32.5 and 30.6 respectively.[10, 20, 21]

With regard to the place of work of respondents, the majority were found to be in the hospitals as compared to the clinics and health centres. 33.6% and 26.7% of the respondents worked at Schweizer-Reneke District Hospital and Joe Morolong Memorial Hospital respectively. A total of 40 % of the respondents were working at the different clinics and the health centre in the Mamusa and Naledi sub-districts. This was to be expected as the hospitals are bigger in size and scope, and more health care workers are registered to work in the hospitals compared to the clinics and health centre.

In terms of the gender distribution of the respondents, 26% were male and 74% were female. Nurses were the majority of the respondents in this study. A total of 92% of the respondents in the study were nurses, with 8% from other health care professions such as doctors and clinical associates. A similar study done in Jordan involving health care workers had close to 50% of the respondents being nurses.[11] Nurses form the backbone of the primary health care sector and as

such, it could be expected that they would make up a significant proportion of the respondents in any study having primary health care workers as its respondents.

5.3 Knowledge of cervical cancer

The study revealed that only 26% of respondents had adequate knowledge of cervical cancer. This finding is similar to results obtained from other studies that concluded that health care workers had limited knowledge about cervical cancer. [18, 21, 23] However, our result differed from other studies which stated that a significant proportion of the health care workers had adequate knowledge of cervical cancer.[19, 24]

The results revealed a significant gap in the level of knowledge of the study's primary health workers. This needs to be dealt with as they are primarily responsible for the fight against cervical cancer, and it would be worthwhile for them to be sufficiently knowledgeable about the subject while disseminating information to the clients they serve.

In this study, there was no significant association between knowledge of cervical cancer and age group, gender and race, however, there was significant association between knowledge of cervical cancer and the health care workers' categories of place of work and highest educational levels.

In a study done in Cameroon among nurses, the researchers found that nurses had moderately low levels of knowledge of prevention of cervical cancer.[2 4] In a similar study done in Canada among health care practitioners, knowledge of cervical cancer was found to be at a medium level.[26] Both these results were in keeping with the findings of this study.

In the study, the highest levels of adequate knowledge of cervical cancer were found in doctors (83%) vs. (11 %) for enrolled nursing assistants.

A reason that can be adduced for this finding is that doctors have gone through an extensive period of training in medicine and as such, would be expected to have significantly more knowledge compared to enrolled nursing assistants who have undergone training for a significantly shorter period of time.

A series of questions were asked in an attempt to establish respondent's knowledge of cervical cancer. One hundred percent of the respondents indicated that they have heard about cervical cancer; this was significantly higher than the figures obtained in a similar study that was done in Mdantsane in the Eastern Cape province, with 60% indicating that they had heard about cervical cancer.[3] In a study done in Jordan, only 53.5% of the respondents were found to be aware of cervical cancer and its prevention.[11] Our result was more in keeping with those obtained in another study in Nigeria, in which the researchers found that 91% of the health care workers were aware of cervical cancer.[21] Cervical cancer is a fairly common disease, hence it would be expected that a significant majority of primary health care professionals would have heard of it.

Results obtained from our study indicated that 78.4% of respondents thought that cervical cancer could be associated with an infection. This was lower than results obtained in a study in Cameroon, where up to 90.8% correctly identified that cervical cancer was directly linked to HPV infection. However, the drawback to this finding was the fact that up to 32% of the respondents in the study failed to identify HPV as a sexually transmitted infection.[24] The discrepancy in the findings between the two studies could possibly be due to a differing quality of health education between the two countries.

The majority of respondents in this study were able to recognize the strong relationship between HPV, HIV, multiple sexual partners and a history of sexually transmitted diseases as significant risk factors for the occurrence of cervical cancer. However, it was noted in the study that more than a third of the respondents did not associate smoking as a strong risk factor in the development of cervical cancer. A large number of respondents felt that physical exercise and use of vitamins could reduce the risk of developing cervical cancer.

With regard to the use of vaccine as a means of primary prevention of cervical cancer, in this study, only 65 % of respondents had heard about the HPV vaccine and knew that it was free of charge, but only 10% knew that it protects from cervical cancer. This was an alarming finding as it indicated that at least one third of the study population was not aware of such a vaccine. This has huge public health implications as these primary health care workers are not in a position to fully educate their patients about cervical cancer if they are not aware of the existence of the vaccine. This result was similar to that obtained in the Nigerian study, in which only 62.7% of the respondents were aware of the HPV vaccine.[21] It should also be noted that about 59% of the

respondents in this study knew the recommended age for vaccination in school children, and only 59% of the participants knew the correct age for the administration of the vaccine. A majority of the participants could identify most of the symptoms of cervical cancer, which showed that they had knowledge of the symptoms, however, their broad knowledge of cervical cancer was low. This might be the reason for the low score shown for adequate knowledge of cervical cancer.

Though the national guidelines state that a Pap smear should be done once in three years for healthy women, 80% of the respondents felt that a Pap smear should be done annually, and 50% felt that the Pap smear should be done between the ages of 17-25years. No literature that spoke in this regard was found.

With regard to the sources of information about cervical cancer, the majority of respondents obtained their information from various sources other than those listed in the study's questionnaire. It was established that respondents received information about cervical cancer from the doctors. Other sources of information chosen by the respondents included the internet, television, schools and newspapers. Cumulatively, sources other than health care professionals as a source of information about cervical cancer were more prevalent when compared to health care professionals as a source of information regarding cervical cancer. The questionnaire used for the study was initially designed for students hence sources of information that may have applied specifically to healthcare workers such as continuous professional development meetings was not listed among the options.

In a study done in East London, South Africa, about 40% of the respondents obtained their information from clinics.[3] In another study done in Jordan, a majority of the respondents obtained their information from medical literature.[11] These findings differed from the findings of this study.

While the impact of the internet and news media cannot be denied as a vital source of health information for the populace, health professionals are a vital component in the dissemination of health information, and it is particularly worrying that a majority of this study's respondents obtained their information from sources other than health care practitioners. Health care practitioners should be encouraged to disseminate information to their patients regarding cervical cancer, HPV and HPV vaccination.

5.4 Knowledge of HPV

It was indicated in this study that 41% (n= 48) of participants had adequate knowledge of HPV. This was a particularly low figure when compared to a study among family physicians in Mexico, that indicated that about 95% of their respondents had knowledge of HPV as a main etiological agent for cervical cancer.[22] This significant difference could result from a difference in study population, with this study containing a pool of different categories of primary health care workers, and the Mexican study containing only family physicians, who are expected to have had significantly more medical training compared to other health care providers. This study's results compare favourably with a study done in Thailand, which indicated that 12-58.3% of respondents had some knowledge of HPV.[27] Another group of researchers, also in Thailand, noted that knowledge of HPV by health care providers was at a medium level.[28]

The fact that health care workers' knowledge of HPV is low should be concerning, particularly given the fact that it is the primary cause of cervical cancer. Health care workers are in the forefront of the fight against cervical cancer and should be expected to be knowledgeable about HPV.

This study found a significant association between the knowledge of HPV and the health care worker category ($p < 0.001$). Doctors were more knowledgeable about HPV than enrolled nurses and enrolled nursing assistants. There is a paucity of such studies, hence comparisons were difficult to make.

However, it was found that there is no significant association between knowledge of HPV and age group, gender, race, and place of work.

5.5 Knowledge of HPV vaccination

67% of the participants had adequate knowledge of the HPV vaccine. 61% knew that there are two different vaccines, and 76% believed that the vaccine was most effective in people who had never had sex. 62% of the participants felt that the HPV vaccine was protective against most cervical cancer types.

More than half of the study's participants (59%) knew the correct age for HPV vaccination. In terms of knowledge of HPV vaccination itself, the study found that compared to health care workers knowledge of HPV, the level of knowledge about HPV vaccination was fairly high. With regard to the knowledge of HPV vaccination among the respondents in the study, the results obtained from the study showed that 67.2% (n = 78) of the respondents had adequate knowledge regarding HPV vaccination compared to 32.8 % (n=38) of the respondents without adequate knowledge of HPV vaccination.

This figure was significantly higher than that obtained in a study done in Haiti, in which only 27% of the respondents were aware of the HPV vaccine.[10] The levels of awareness of HPV vaccination in another study was 62.7%.[21] This was comparable to that obtained in this study. Another study among nurses in Cameroon found that the respondents had a moderately high level of knowledge of HPV vaccination.[24] Health care workers are responsible for the dissemination of health care information and as such, this represented a significant gap in their knowledge of HPV vaccination .

This study found that doctors had more knowledge of HPV vaccination (100%) compared to enrolled nursing assistants (64%), and enrolled nurses (48%). A dichotomy between knowledge levels of doctors and clinical associates as compared to enrolled nursing assistants and enrolled nurses was noted. This finding was corroborated by such a finding in another study that stated that physician groups had significantly more awareness about HPV and the HPV vaccine than non-physician staff members.[25] Another study stated that both nurses and doctors had a positive attitude towards HPV cervical cancer and HPV vaccination.[26]

The implication of such findings is that more emphasis should be placed on educating the primary health care workers in the lower ranks to ensure that their knowledge of HPV and HPV vaccination is extensive and up to date. This is highly significant as it would mean that health care workers are well skilled and motivated to introduce the HPV vaccine to patients who require it.

5.6 Limitations of the study

A limitation of the study is the fact that self-reporting questionnaires were used to collect data for the study, hence there was no way to tell how truthful the respondents were being when answering some of the questions that were personal in nature. This could have led to possible information bias. Some healthcare workers went home with the questionnaires before submission; it is a possibility that they might have consulted books or other resources before answering the questions.

The majority of participants in the study were nurses. Doctors and clinical associates were in the minority (8%) hence, it would be difficult to make sweeping conclusions and comparisms between the different health care worker categories.

Due to the fact that the questionnaire used for the cervical cancer section was initially designed for students, part of the questionnaire asking for their sources of information about cervical cancer included options such as leaflets, television, friends and family. These are not conventional sources of information for a specialized group such as health care workers hence options such as journals, continuous professional development sessions and trainings were not available as sources of information in the questionnaire hence a limitation to the study.

HIV has been noted to be closely linked to the development of HPV and cervical cancer, however the questionnaire used for this study did not adequately test the participants about this relationship. This is a limitation in this study.

5.7 Conclusion

Studies have been done assessing knowledge of cervical cancer, HPV and HPV vaccination, however, a paucity of these studies was noted among rural based South African primary health care workers. A majority of the study participants had adequate knowledge on HPV vaccine, but lacked knowledge on cervical cancer and HPV.

This was an alarming finding as it was expected that primary health care workers should be extensively knowledgeable about cervical cancer since they are in a position of giving health

information to patients. Cervical cancer is the second most common cancer among women in South Africa, hence this knowledge deficit among primary health care workers constitutes a grave concern.

Though this study has shown that doctors have more knowledge than other health care categories, the majority of participants were nurses. Nurses are the pillars of primary health care in South Africa, hence their knowledge of cervical cancer, HPV and HPV vaccinations should be sufficiently adequate to reduce the burden of cervical cancer.

The Pap smear is a significant tool in the arsenal for the fight against cervical cancer, especially in developing countries. It plays a prominent part in the national guidelines for cervical cancer screening and is of high importance if health care workers are well trained and appropriately knowledgeable on it. This study has highlighted the finding that health care workers are not knowledgeable about the intervals and the correct age for a Pap smear test.

A low proportion of the respondents in the study had obtained their information about cervical cancer from health care professionals. This is particularly worrying as the information received from this other source may not be factually correct. It could also indicate that patients attending health care facilities might not be getting appropriate health education messages from these facilities. This is an area that needs to be scrutinized and improved drastically.

Knowledge of HPV amongst the primary health care workers was found to be inadequate, and suggested that there is low awareness of the link between HPV and cervical cancer.

Surprisingly enough, a majority of the primary health care workers had adequate knowledge about the HPV vaccine. This could be due to campaigns and the recent training regarding HPV vaccination.

Primary health care workers are the bedrock of the health care system. Our study shows that gaps still exist in the knowledge levels of health care workers, who are in the forefront of the fight against cervical cancer. Educating primary health care workers through various means including continuous professional development particularly for health care workers in remote areas could help correct this knowledge deficit gap.

CHAPTER SIX RECOMMENDATIONS

- Workshops and training on cervical cancer, HPV and HPV vaccination should be given to all primary health care workers on a regular basis.
- National guidelines on cervical cancer and HPV in the form of colourful posters should be placed in strategic areas in all primary health care facilities.
- Health education on cervical cancer, HPV and HPV vaccination should be offered by primary health care workers to their clients on a regular basis.
- Family physicians should take the lead in educating / training primary health care workers at all local facilities on how to do Pap smear tests.
- Family physicians should also do regular audits of Pap smear techniques and results.

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APPENDIX A: QUESTIONNAIRRE

QUESTIONNAIRE STUDY ABOUT KNOWLEDGE OF CERVICAL CANCER AMONG PRIMARY HEALTH CARE WORKERS IN THE MAMUSA AND NALEDI SUB – DISTRICTS, NORTH WEST PROVINCE

Instructions

This questionnaire attempts to assess your knowledge about cervical cancer, HPV and HPV vaccination. Please answer all the questions. If you are unsure about which response to give to a question, please choose the ONE that appears most appropriate. Thank you for your time**.**

1 SOCIO-DEMOGRAPHIC CHARACTERISTICS

1) Age…….....

2) Place of work……

3) Gender: Male ☐ Female ☐

4) Race …….

5) Health care worker category? (Please mark the correct option)

☐Doctor ☐ Clinical associate ☐ Professional nurse ☐ Enrolled nurse ☐ Enrolled nursing assistant

6) Highest level of education……

II GENERAL KNOWLEDGE ABOUT CERVICAL CANCER

(Please mark with **X** the one option that you feel best answers the question)

1. Have you heard about cervical cancer?

Yes ☐ No ☐ I don't know ☐

2. Can cervical cancer be a terminal illness (can you die from cervical cancer)?

Yes ☐ No ☐ I don't know ☐

3. Can cervical cancer be associated with an infection?

Yes ☐ No ☐ I don't know ☐

4. Is there an effective method that significantly reduces the risk of this disease?

Yes ☐ No ☐ I don't know ☐

5. Have you ever had direct contact with the disease (e.g., has any of your a relative or friends suffered from it)?

Yes ☐ No ☐ I don't know ☐

6. Do you think this disease could affect you in future?

Yes ☐ No ☐ I don't know ☐

III RELATIONSHIP BETWEEN ESTIMATED RISK FACTORS AND THE OCCURRENCE OF CERVICAL CANCER

With 0 indicating no relationship and 5 indicating a very strong relationship, kindly choose a number that you think best denotes the strength of the relationship between the listed risk factors and the occurrence of cervical cancer

	0	**1**	**2**	**3**	**4**	**5**
Young age						
Genetic factors						
Human papilloma virus						
Human immunodeficiency virus (HIV)						

Multiple sexual partners						
Early sexual initiation/debut						
History of sexually transmitted diseases						
Alcohol abuse						
Smoking						
Miscarriages and abortion						
A large number of pregnancies/Multiparity						
Early menarche						
Use of condoms						
Hormonal contraception						
Breastfeeding						
Use of psychoactive drugs						
Use of public swimming pool						

IV KNOWLEDGE ABOUT PRIMARY PREVENTION OF CERVICAL CANCER

A. Lifestyle

Do you think that the following factors can reduce the risk of developing cervical cancer? (Please cross the one option that best responds to the question.)

a) A diet rich in anti-oxidants

Yes ☐ No ☐ I don't know ☐

b) Regular physical exercise

Yes ☐ No ☐ I don't know ☐

c) Use of vitamin supplements

Yes ☐ No ☐ I don't know☐

d) Proper long and relaxing sleep

Yes ☐ No ☐ I don't know ☐

e) Avoiding high processed food

Yes ☐ No ☐ I don't know ☐

f) Avoiding genetically modified food

Yes ☐ No ☐ I don't know ☐

g) Weight loss

Yes ☐ No ☐ I don't know ☐

h) Restraint from casual sex

Yes ☐ No ☐ I don't know ☐

B. Vaccine

a) Have you heard about the vaccine against cervical cancer?

Yes ☐ No ☐ I don't know ☐

b) If such a vaccine exists, is it available in South Africa?

Yes ☐ No ☐ I don't know ☐

c) Is it free of charge?

Yes ☐ No ☐ I don't know ☐

e) Does it guarantee 100% protection from cervical cancer?

Yes ☐ No ☐ I don't know ☐

f) Do you know where you can get vaccinated?

Yes ☐ No ☐ I don't know ☐

g) Have you ever been vaccinated?

Yes ☐ No ☐ I don't know ☐

C. What is the best year to get vaccinated?

8 years ☐ 9-13 years ☐ 14-18years☐ 19-25years ☐ > 25 years ☐

V KNOWLEDGE ABOUT SECONDARY PREVENTION

The following are the symptoms that may be associated with presence of cancer of the cervix. (Please cross with an **X** the one option that best responds to the question).

a. Lack of symptoms from the genital areas

Yes ☐ No ☐ I don't know ☐

b. Painful menstruation

Yes ☐ No ☐ I don't know ☐

c. Intensive periods or bleeding between periods

Yes ☐ No ☐ I don't know ☐

d. Irregular menstruation or lack of menstruation

Yes ☐ No ☐ I don't know ☐

e. Smelly vaginal discharge

Yes ☐ No ☐ I don't know ☐

f. Itchy rash in the genital area

Yes ☐ No ☐ I don't know ☐

g. Bleeding after intercourse

Yes ☐ No ☐ I don't know ☐

h. High fever

Yes ☐ No ☐ I don't know ☐

VI CYTOLOGICAL EXAMINATION

(Please mark **X** the one option that best responds to the question).

a. Have you heard of the Pap smear?

Yes ☐ No ☐ I don't know ☐

b. Is it a test that gives you 100% chance of early diagnosis of cervical cancer?

Yes ☐ No ☐ I don't know ☐

c. Is the test painful**?**

Yes ☐ No ☐ I don't know ☐

d. Is it a time-consuming test**?**

Yes ☐ No ☐ I don't know ☐

e. In South Africa is it possible to be tested free of charge**?**

Yes ☐ No ☐ I don't know ☐

f. Does doing the test only once eliminate the lifetime risk of cervical cancer?

Yes ☐ No☐ I don't know ☐

g. Can the test cause serious complications?

Yes ☐ No☐ I don't know ☐

h. Is it possible for the Pap smear to increase your chances of getting cervical cancer in the future**?**

Yes ☐ No ☐ I don't know☐

i. How often should the Pap smear test be done**?**

Every year ☐ Every 3 years ☐ Every 5 years ☐

Every 10years ☐ Only once ☐

j. At what age (year) can women in South-Africa undergo cytological examination free of charge?

17-25 years ☐ 26-59☐years > 60 years☐ any age ☐

k. How long after sexual initiation/debut should women undergo the test?

< 1year ☐ 1-3years ☐ 4-6years ☐

VII What is the source of your information about cervical cancer?

Internet ☐ Television ☐ Newspapers ☐ Doctors☐ Leaflets ☐

School ☐ Family ☐ Other (please specify) _____

QUESTIONNAIRE ABOUT KNOWLEDGE OF HUMAN PAPILLOMA VIRUS AND HPV VACCINATION AMONG PRIMARY HEALTH CARE WORKERS IN THE MAMUSA AND NALEDI DISTRICTS, NORTH WEST PROVINCE

VIII KNOWLEDGE OF HUMAN PAPILLOMA VIRUS (HPV)

(Please cross with an **X** the correct answer)

HPV is very rare	True	False
HPV has visible signs or symptoms	True	False
HPV can cause cervical cancer	True	False
HPV can be passed on by genital skin-to-skin contact	True	False
There are many types of HPV	True	False
HPV can cause HIV/AIDS	True	False
HPV can be passed on during sexual intercourse	True	False
HPV can cause genital warts	True	False
Men cannot get HPV	True	False
Using condoms reduces the risk of getting HPV	True	False
HPV can be cured with antibiotics	True	False
Having many sexual partners increases the risk of getting HPV	True	False
HPV usually doesn't need any treatment	True	False
Most sexually active people will get HPV at some point in their lives	True	False
A person could have HPV for many years without knowing it	True	False
Having sex at an early age increases the risk of getting HPV	True	False
An HPV test can tell how long you have had an HPV infection	True	False
If a woman tests positive for HPV she will definitely get cervical cancer	True	False
An HPV test can be done at the same time as a [Pap test/Smear test/Pap smear test]	True	False
HPV testing is used to indicate if the HPV vaccine is needed	True	False
When you have an HPV test, you get the results the same day	True	False

If an HPV test shows that a woman does not have HPV, her risk of cervical cancer is low	True	False

IX KNOWLEDGE ABOUT HPV VACCINATION

Please cross with an **X** the correct answer

HPV vaccines require two doses	True	False
The HPV vaccine offers protection against all sexually transmitted infections	True	False
The HPV vaccines are most effective if given to people who have never had sex	True	False
Someone who has had HPV vaccine cannot develop cervical cancer	True	False
The HPV vaccine offer protection against most cervical cancers	True	False
One of the HPV vaccines offers protection against genital warts	True	False
Girls who have had HPV vaccine do not need a [Pap test/Smear test/Pap smear test] when they are older	True	False

APPENDIX B: PARTICIPANTS INFORMATION SHEET

PARTICIPANT'S INFORMATION,

Good day health care provider,

I am Dr Ajayi Adekunle, a third year registrar in family medicine at Witwatersrand University and allocated at Dr Ruth Mompati District North West Province. I am conducting a research titled **"Knowledge of Cervical cancer, Human papilloma virus and HPV vaccination among primary health care workers in the Mamusa and Naledi sub-district. North-West province".**

This project is aimed at knowing the level of knowledge of our primary health care workers about pertinent issues regarding cervical cancer, HPV and HPV vaccination.

Your personal information would not be divulged to anyone and nobody would have access to such information except for the researcher.

The problems identified in this observation will be addressed, changes decided and implemented. The study would be conducted through the use of self-administered questionnaire .The findings and recommendations of the study will be reported to the staff working in the clinic/hospital and the authorities of the clinic/hospital. This would be done with the aim of improving the delivery of care to our patients.

The results may be published in the peer-reviewed journal for academic purpose. In, both cases, confidentiality of your personal details will be strictly observed and protected.

Thank you.

Yours sincerely

Ajayi A.O

APPENDIX C: CLEARANCE CERTIFICATE

R14/49 Dr Ajayi Adekunle Omoniyi

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160312

NAME: (Principal Investigator)	Dr Ajayi Adekunle Omoniyi
DEPARTMENT:	Family Medicine Naledi and Mamusa Sub Districts Health Facilities, North West Province
PROJECT TITLE:	Knowledge of Cervical Cancer, Human Papilloma Virus and HPV Vaccination among Primary Health Care Workers in the Mamusa and Naledi Sub-District. North West Province
DATE CONSIDERED:	01/04/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr S.E Abizu
APPROVED BY:	Professor P. Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	03/06/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004,10th floor, Senate House/2nd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated,from the research protocol as approved, I/we undertake to resubmit to the Committee. I **agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review in March and will therefore be due in the month of March each year.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

health
Department of
Health
North West Province
REPUBLIC OF SOUTH AFRICA

32 Market Street
VRYBURG, 8601
Private Bag X24
VRYBURG,8600

Tel: (053) 927 0456/7/8
Fax: (053) 927 0009

DR RUTH SEGOMOTSI MOMPATI DISTRICT

Enq: Mr Matlhako

TO: DR AJAYI ADEKUNLE OMONIYI
MEDICAL OFFICER

FROM: MR MATLHAKO
SUB-DISTRICT MANAGER

Date: 24 May 2016

SUBJECT: PERMISSION TO CARRY OUT RESEARCH

In respect to your request to do a research in Naledi Sub-District titled knowledg of cervical cancer, Human Papiloma virus (HPV) and HPV vaccination among primary Health Care worker permission is hereby granted. You will also have to get approval from the North West provincial research committee.

Yours Faithfully

MR M. MATLHAKO
SUB-DISTRICT MANAGER
NALEDI SUB-DISTRICT

DATE: 25/05/16

APPENDIX D: CLEARANCE FROM THE DISTRICT

APPENDIX E: PERMISSION TO USE QUESTIONNAIRE

8/22/2017 Print Window

Subject: Re: validation of a measure of knowledge about HPV using item response theory and classical test theory

From: j.waller@ucl.ac.uk
To: kunleajayi81@yahoo.com
Date: Tuesday, September 1, 2015, 9:46:38 PM GMT+2

Dear Dr Ajayi

Yes, please do use our measure - we just ask that people reference our paper appropriately in any publications that arise from the work, but no permissions are needed to use the questionnaire.

Best wishes

Jo

~~~~~~~~~~~~~~~~

Dr Jo Waller
Cancer Research UK Career Development Fellow in Behavioural Science
Principal Research Associate
CR-UK Health Behaviour Research Centre
Department of Epidemiology and Public Health
UCL, 1-19 Torrington Place
LONDON WC1E 6BT
Tel: 020 7679 5958
Internal: 45958
Email: j.waller@ucl.ac.uk
www.ucl.ac.uk/hbrc
Twitter @Jo_WalllerUCL

From: Kunle Ajayi <kunleajayi81@yahoo.com>
Sent: 31 August 2015 12:21
To: Waller, Jo
Subject: validation of a measure of knowledge about HPV using item response theory and classical test theory

Dear Sir/Ma,

My name is Dr Kunle Ajayi. I am a registrar in family medicine at the University of Witwatersrand,Johannesburg. i am conducting a research assessing the knowledge of health care workers about cervical cancer ,HPV and HPV vaccination . I came across your work on this subject while undertaking an extensive literature review on the subject.
i am requesting your permission to use your validated questionnaire as one of data collection tool.
i hope this would be acceptable to you
Thank you
DR AJAYI
~~~~~~~~~~~~~~~~

APPENDIX F: PERMISSION TO USE CCKP QUESTIONNAIRE

8/22/2017 Print Window

Subject: Re: permission to use cervical cancer knowledge prevention 64 questionnaire

From: krtomaszewski@gmail.com
To: kunleajayi81@yahoo.com
Date: Monday, August 31, 2015, 1:18:53 PM GMT+2

Dear Dr Ajayi,

thank you for your e-mail. You have our full authorization to use the CCKP-64 questionnaire, in its unmodified version, for your research.
We hope that your study will be a successful one.

Kind regards,
Krzysztof Tomaszewski

On Mon, Aug 31, 2015 at 12:16 PM, Kunle Ajayi <kunleajayi81@yahoo.com> wrote:

Dear Sir,
My name is Dr Kunle Ajayi. I am a registrar in family medicine at the University of Witwatersrand, Johannesburg. i am conducting a research assessing the knowledge of health care workers about cervical cancer. I came across your work on this subject and i am requesting your permission to use your questionnaire (Cervical cancer knowledge prevention 64 questionnaire) as my data collection tool.
i hope this would be acceptable to you
Thank you
DR AJAYI